Planning Wetland Restoration Projects at the Landscape Level using a Spatial Decision Support System

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OUTLINE

1. What is a Spatial Decision Support System (SDSS)?
2. Case Study – Mississippi Gulf Coast
3. SDSS Creation Tool

WHAT IS A SPATIAL DECISION SUPPORT SYSTEM?

- Method for combining spatial data and expert knowledge to aid in land use planning and management decisions.

- Utilizes Geographic Information System (GIS) technologies

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ArcMap™ Version 9.2
ESRI ArcGIS™
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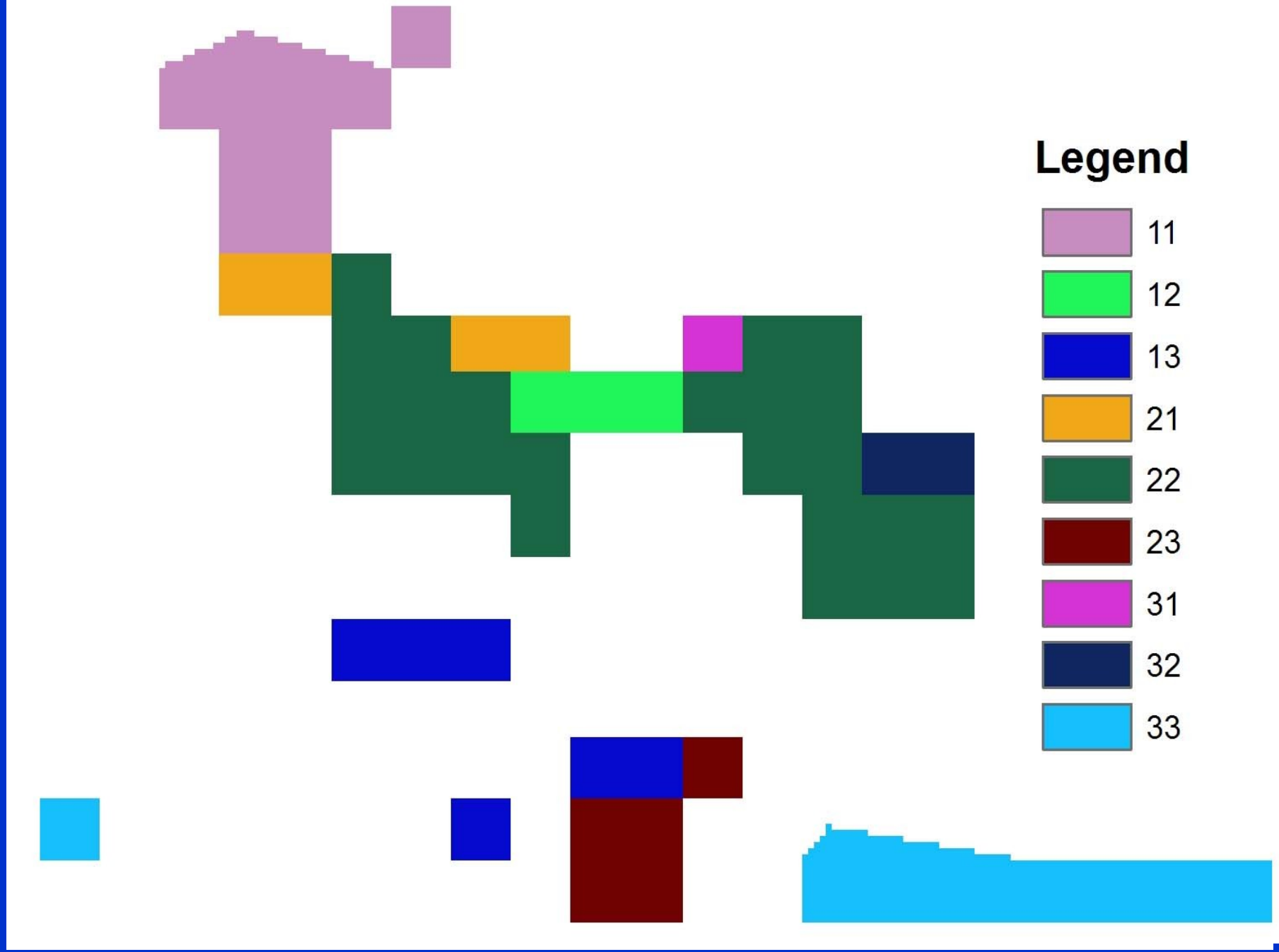
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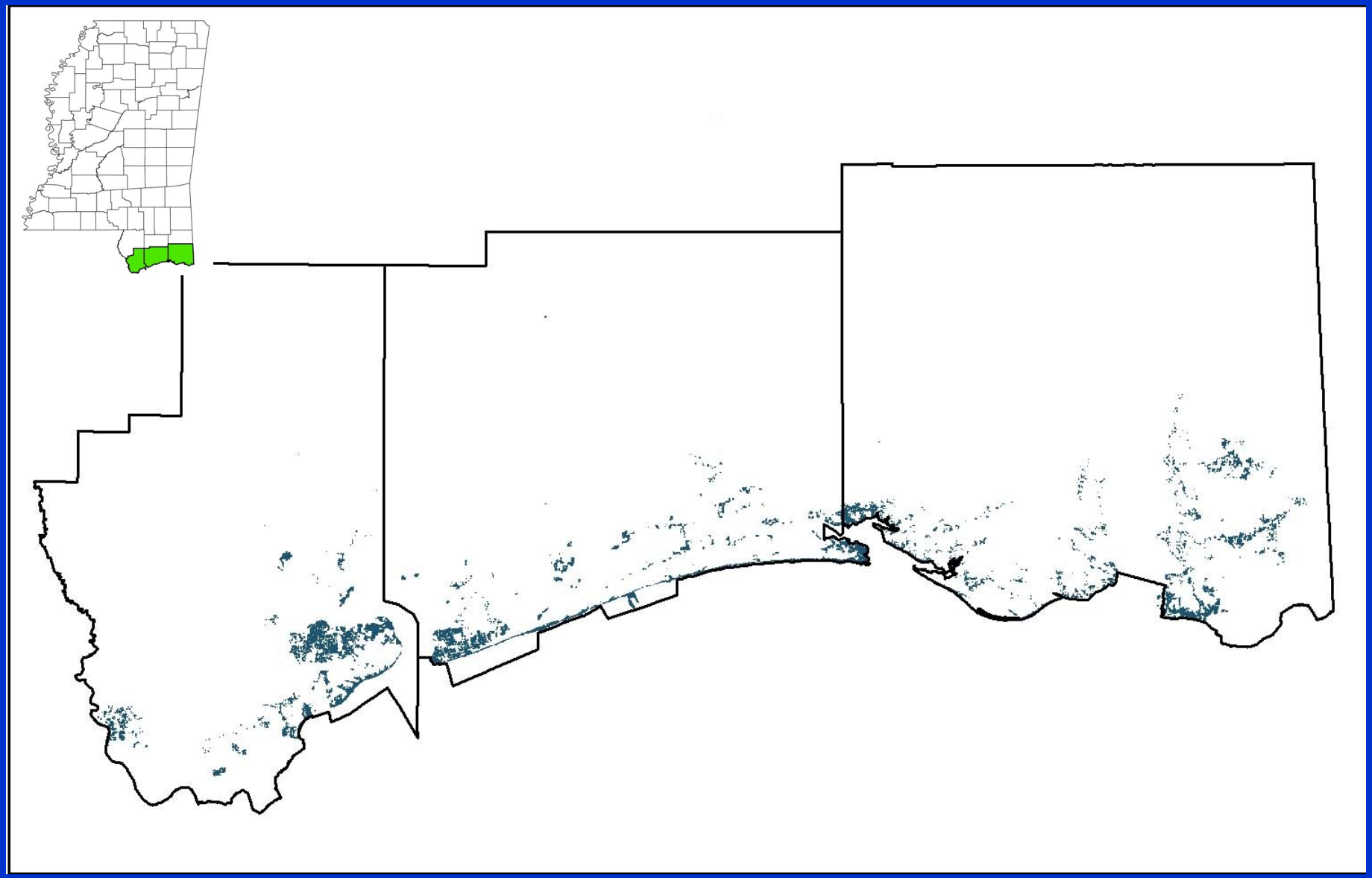
CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST



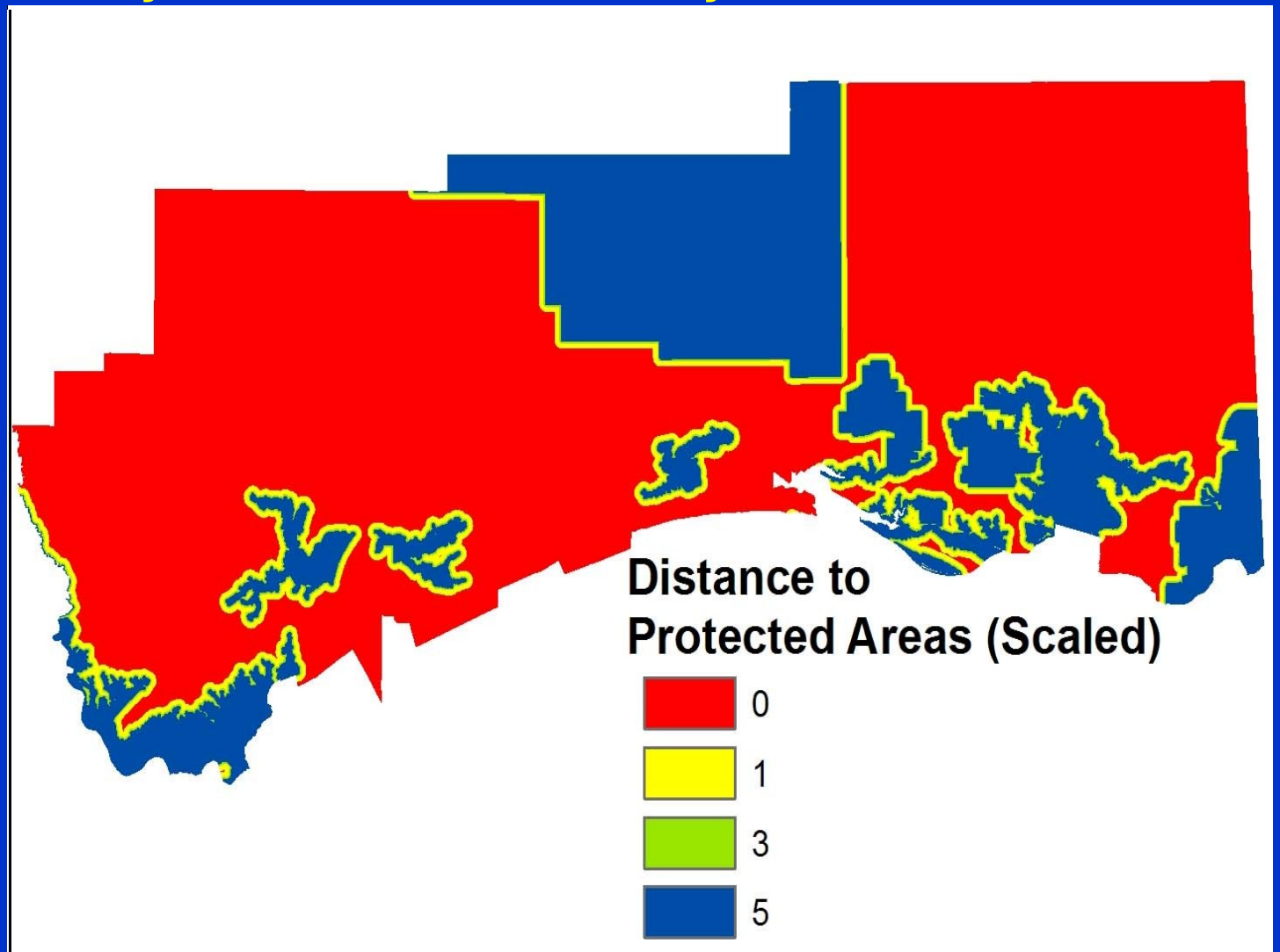
CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST

Factors used to evaluate sites

- Habitat
- Storm/Flood Protection
- Restorability
- Total Score

CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST

- Identify and Scale Data Layers

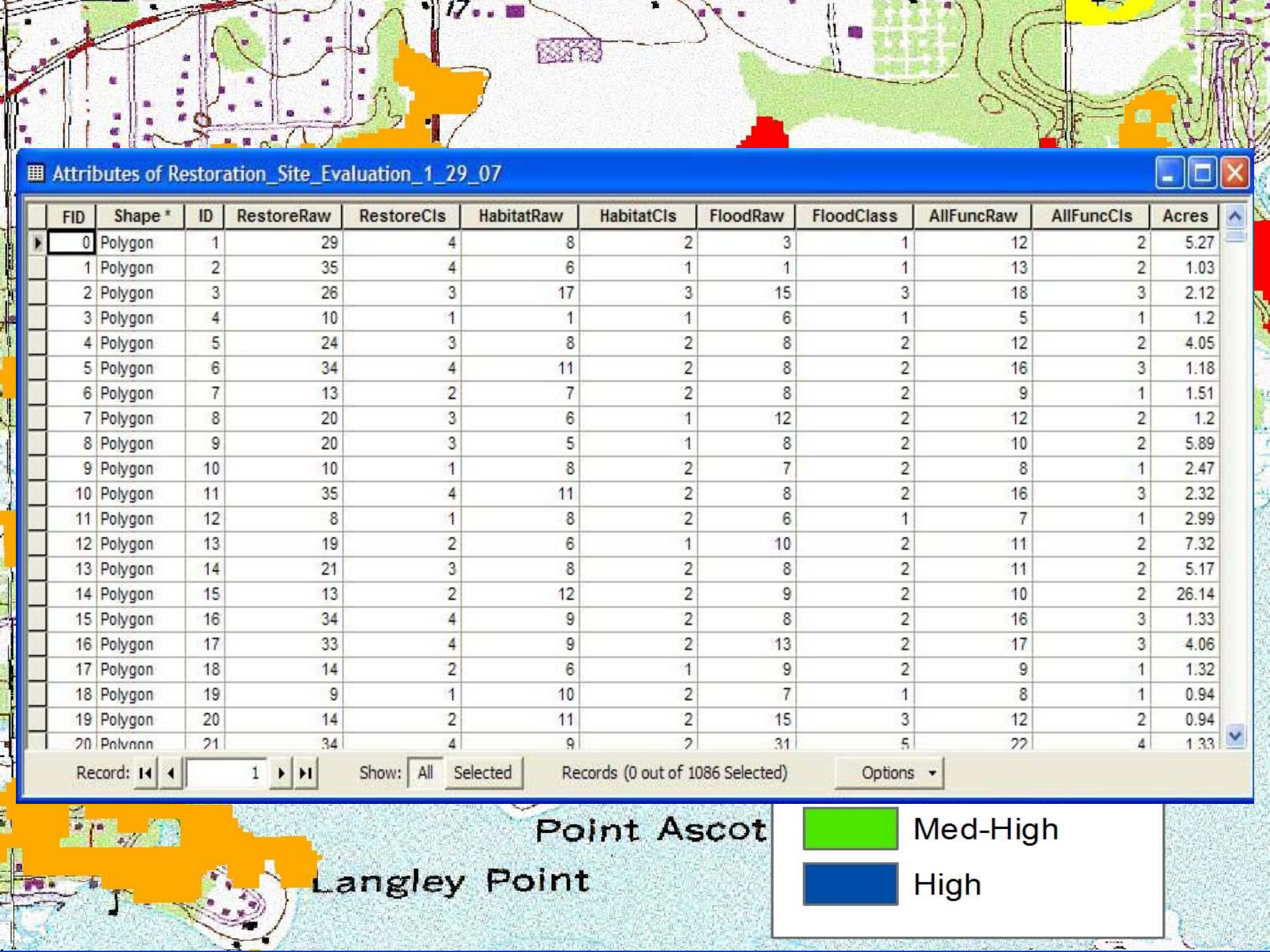


CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST

Function	Variable	Raw Value	Scaled Score
Storm/Flood Protection	Depressions	1	15
		0	0
	Storm Surge Category	5	1
		4	3
		3	5
		2	8
		1	10
	Stream Buffer	1	15
		0	0

Restorability	Hydric Soils	1	20
		0	0
	Wetness Index	-10.6 - 1.44	0
		1.44 - 13.5	5
		13.5 - 25.6	10
	Distance to Seed Source (m)	0 - 60	10
		60 - 120	5
		> 120	0

Other	MDMR Restoration Sites	1	3
		0	0
	Damage Level	1	3
		3	1
		6	0
	Proposed Coastal Preserves	1	3
		0	0



FID	Shape *	ID	RestoreRaw	RestoreCls	HabitatRaw	HabitatCls	FloodRaw	FloodClass	AllFuncRaw	AllFuncCls	Acres
0	Polygon	1	29	4	8	2	3	1	12	2	5.27
1	Polygon	2	35	4	6	1	1	1	13	2	1.03
2	Polygon	3	26	3	17	3	15	3	18	3	2.12
3	Polygon	4	10	1	1	1	6	1	5	1	1.2
4	Polygon	5	24	3	8	2	8	2	12	2	4.05
5	Polygon	6	34	4	11	2	8	2	16	3	1.18
6	Polygon	7	13	2	7	2	8	2	9	1	1.51
7	Polygon	8	20	3	6	1	12	2	12	2	1.2
8	Polygon	9	20	3	5	1	8	2	10	2	5.89
9	Polygon	10	10	1	8	2	7	2	8	1	2.47
10	Polygon	11	35	4	11	2	8	2	16	3	2.32
11	Polygon	12	8	1	8	2	6	1	7	1	2.99
12	Polygon	13	19	2	6	1	10	2	11	2	7.32
13	Polygon	14	21	3	8	2	8	2	11	2	5.17
14	Polygon	15	13	2	12	2	9	2	10	2	26.14
15	Polygon	16	34	4	9	2	8	2	16	3	1.33
16	Polygon	17	33	4	9	2	13	2	17	3	4.06
17	Polygon	18	14	2	6	1	9	2	9	1	1.32
18	Polygon	19	9	1	10	2	7	1	8	1	0.94
19	Polygon	20	14	2	11	2	15	3	12	2	0.94
20	Polygon	21	34	4	9	2	31	5	22	4	1.33

Record: 1 Show: All Selected Records (0 out of 1086 Selected) Options

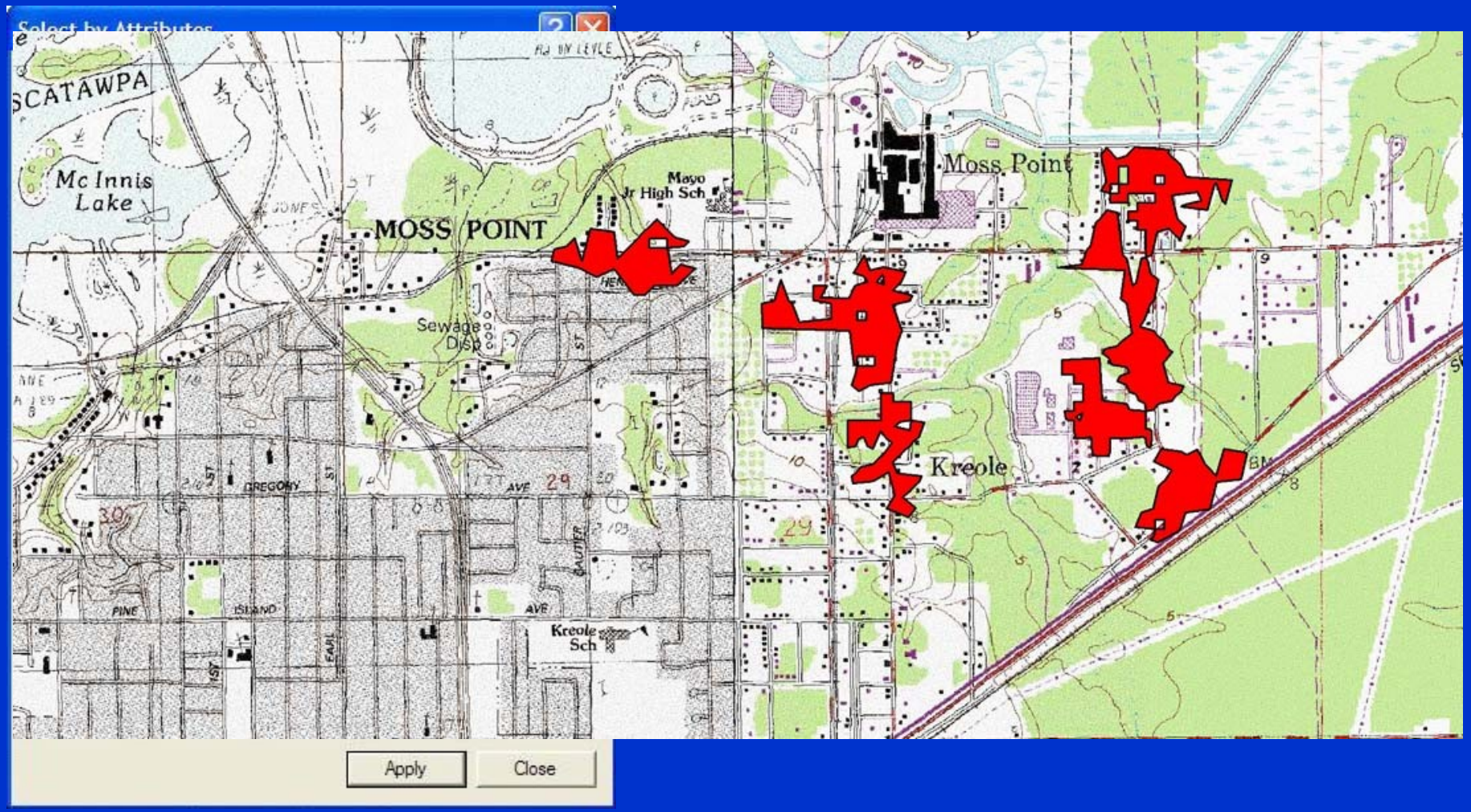
CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST

1,086 sites (7,891 acres) evaluated

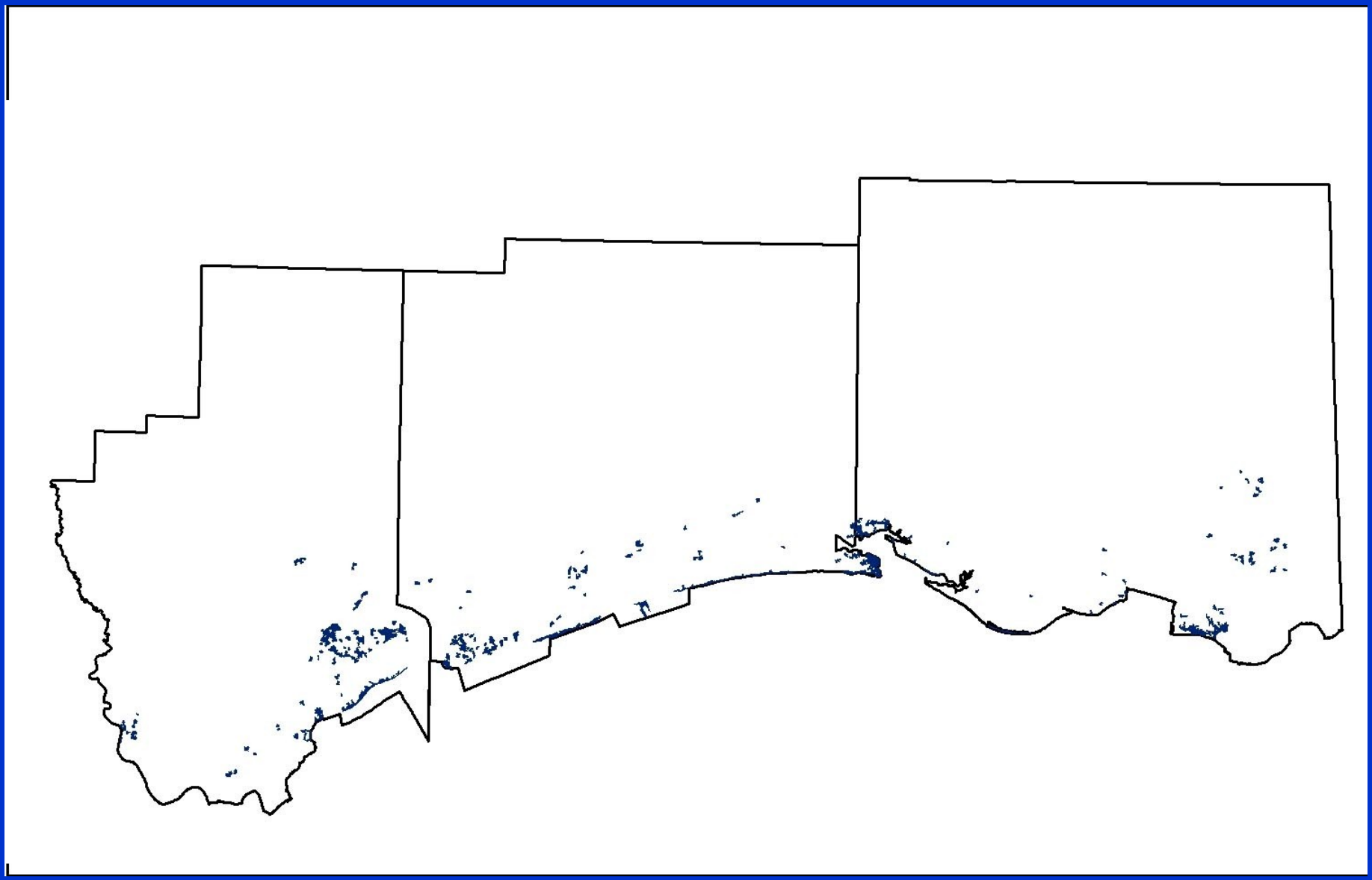
		Function							
		Habitat		*Restorability*		*Storm/Flood Protection*		*All Functions*	
		# of Sites	Total Acres	# of Sites	Total Acres	# of Sites	Total Acres	# of Sites	Total Acres
Classified Value	1	101	255	66	396	26	93	48	156
	2	452	1,633	248	1,596	531	3,933	243	1,520
	3	314	3,608	178	2,703	402	3,405	556	4,702
	4	152	1,970	405	2,665	78	325	204	1,355
	5	67	425	189	532	49	135	35	159

CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST

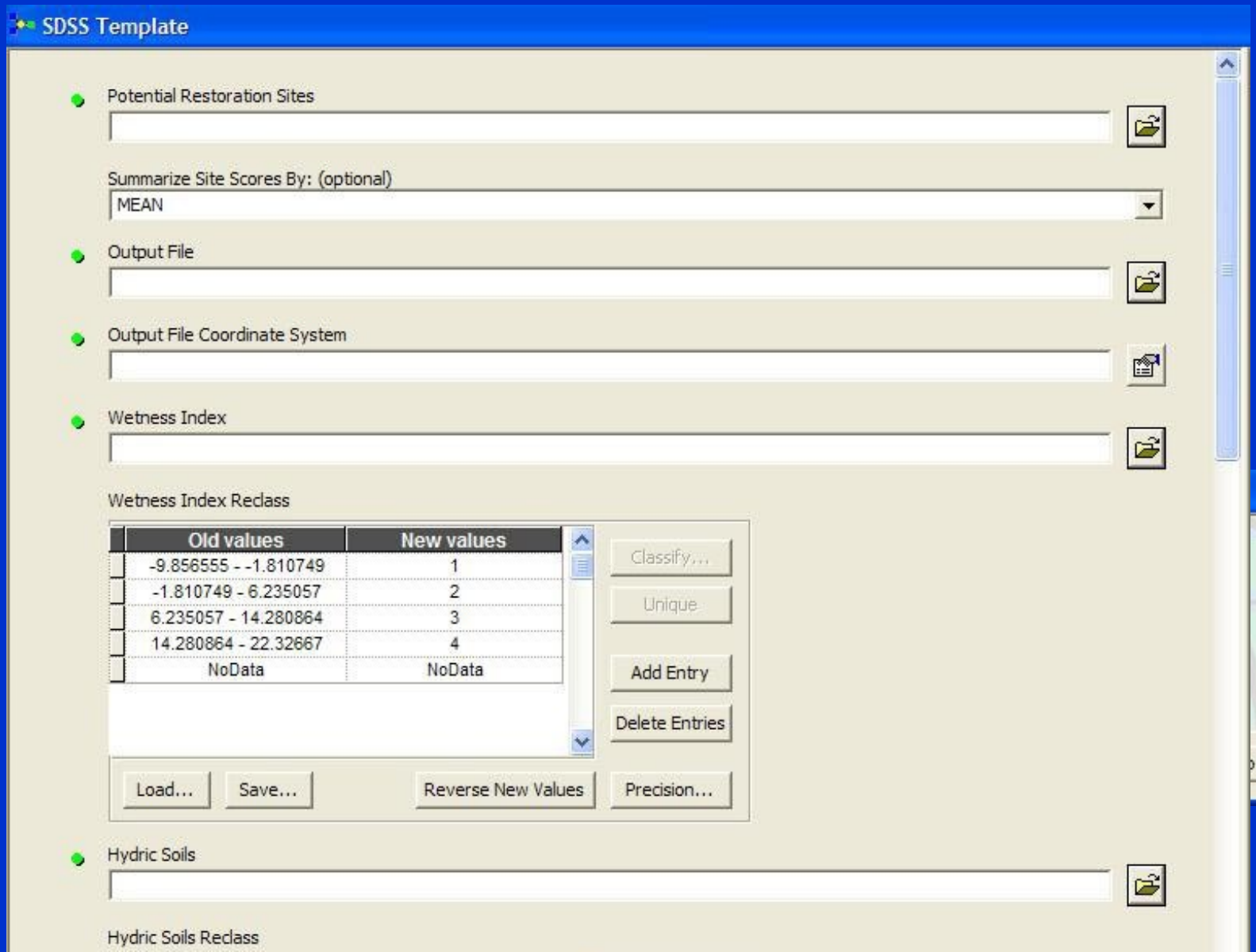
- Screen Results

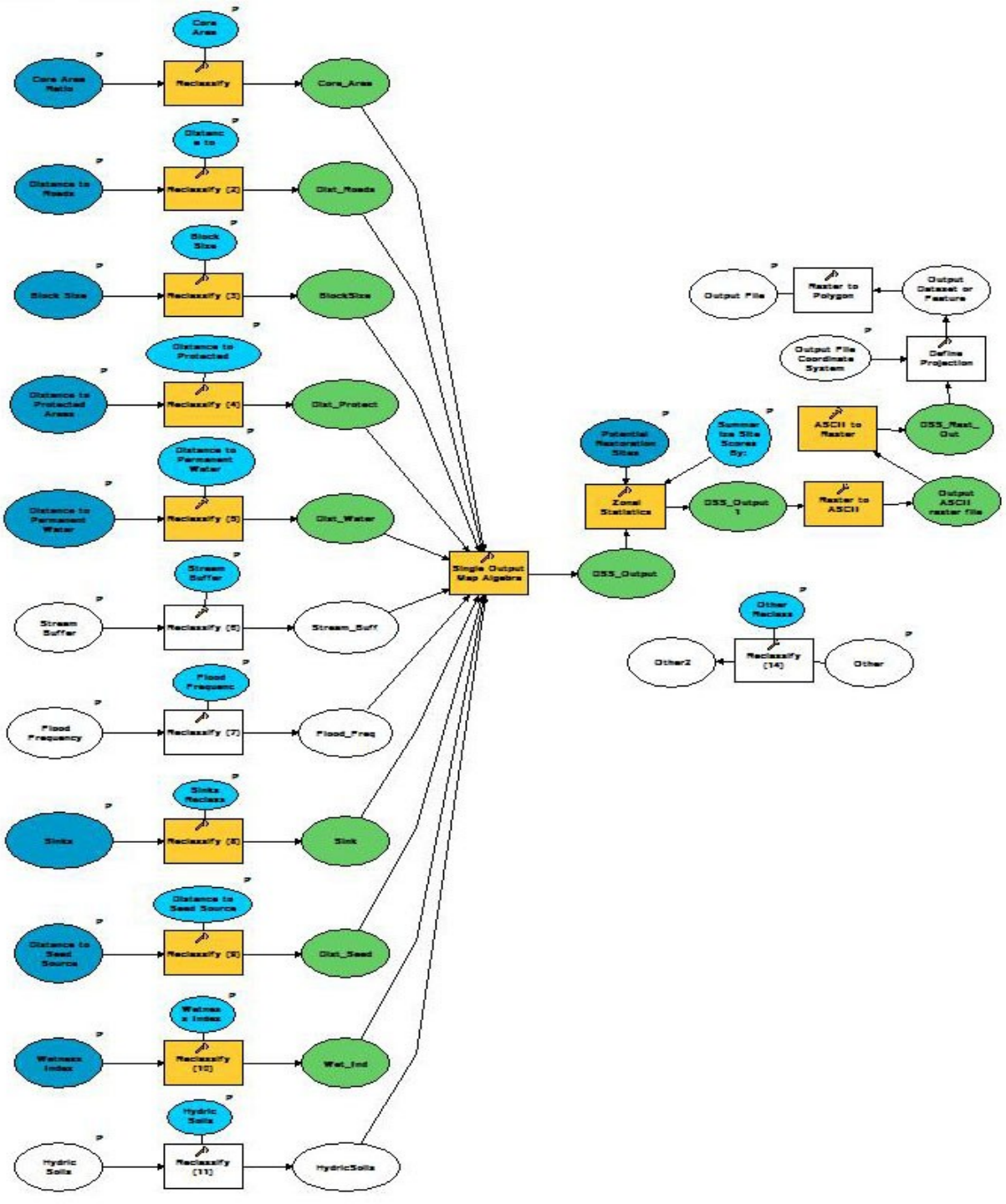


CASE STUDY: IDENTIFYING POTENTIAL WETLAND RESTORATION SITES IN THE MISSISSIPPI GULF COAST



A WETLAND RESTORATION SDSS CREATION TOOL




Core Area
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Reclassify
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Distance to Roads
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Block Size
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Single Output Map Algebra
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Potential Restoration Sites
Summarize Site Scores By:
Zonal Statistics
OSS_Output 1
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Output ASCII raster file
ASCII to Raster
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Define Projection
Output File Coordinate System
Raster to Polygon
Output File
Output Dataset or Feature
Other Reclass
Reclassify (14)
Other
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KEY TAKEAWAY POINTS

❖ Advantages

- Able to analyze large areas in a relatively short amount of time
- Results are transparent and easily visualized
- Flexible

❖ Disadvantages

- Reliant on accuracy, resolution, and availability of spatial data
- Scaling and selection variables can be subjective

ADDITIONAL INFORMATION

A Wetland Restoration Spatial Decision Support System for the Mississippi Gulf Coast

by Jeff P. Lin and Barbara A. Kleiss

http://el.erdc.usace.army.mil/elpubs/pdf/trel07-12.pdf

Creating a Wetland Restoration Decision Support System Using GIS Tools

By Jeff P. Lin, Scott G. Bourne, and Barbara A. Kleiss

http://el.erdc.usace.army.mil/elpubs/pdf/em05.pdf

Wetland Restoration SDSS GIS Tool

Fact Sheet:
http://el.erdc.usace.army.mil/elpubs/pdf/em06.pdf

Tool Download: http://el.erdc.usace.army.mil/emrrp/gis.html

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“All models are wrong, some models are useful.”

George Box